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		PERI	ORMANCE	EXCEPTIONS	
1)		ockout/Tagout Use Definitions	1)	Lockout/Tagout Use  a) ESH 1.5.0 Electrical Safety and ES&H 1.5.1 Lockout/Tagout  Requirements provides definitions for use of Lockout and Tagout devices.  C-AD procedures OPM 1.5, "Electrical Safety Implementation Plan," and OPM 2.36, "Lock and Tag Program for Control of Hazardous Energy" comply with these BNL Standards.	1) Lockout/Tagout Use None
	b)	<u>Lockout</u> is the placement of a lock to render a device inoperable		D) Lockout at C-AD is the placement of a lock to render a device inoperable	
	c)	<u>Tagout</u> is the application of a warning device on a control indicating the control must not be used when the tag is removed by authorized persons		e) Tagout at C-AD is the application of a warning device on a control	
	d)	Use of keys should be controlled		Lockout keys are controlled; OPMs 2.6, 2.6.1, 2.6.2, 2.6.3, 2.6.4, 2.6.5, 2.6.6, 2.6.8 and 9.1.16 are examples of C-AD procedures that provide lockout and tagout instructions for specific systems	
2)	Loc	ckout and Tagout Implementation	2)	Lockout and Tagout Implementation	2) Lockout and Tagout
		If an isolating device can be locked out, then it should be locked out	,	The C-AD uses locks wherever locks can possibly be applied, or where locks can be retrofitted for the purpose of isolating devices	Implementation None
	b)	If an isolating device can not be locked out, it should be tagged out		Tagouts are used at C-AD if a device cannot be locked out	
	c)	If major modifications to equipment are made, the addition of lock out capability should be considered		New and modified installations are fitted with lockouts in accord with SBMS requirements. See <a href="OPM 2.36">OPM 2.36</a> , "Lock and Tag Program for Control of Hazardous Energy", section 5.2.7.	
	d)	The following are example administrative controls:  i) Generate a list of devices that must be locked out		i) The C-AD uses the following administrative controls:  i) Lists of devices that must be locked out. See, for example, OPM  2.6.1.a, "AGS Ring Lockout-Tagout Checklist – CONTROLLED  ACCESS."	
		ii) Establish criteria for locking out		ii) Written criteria for lockout. See, for example, <a href="OPM 9.1.16">OPM 9.1.16</a> "Lockout / Tagout for Radiation Safety."	

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iii)	Control the distribution of and access to keys	iii) Controls for the distribution and access of keys. See <a href="OPM 4.1.c">OPM 4.1.c</a> , "Keys Required to Access Primary Beam Enclosures," <a href="OPM 2.6.1">OPM 2.6.1</a> , "Lockout Tagout Procedure for AGS and Booster Rings During Accelerator Operations," paragraph 5.2.6 and <a href="OPM 7.1.39">OPM 7.1.39</a> , "Cryogenic Group Lockout/Tagout," paragraph 5.4.8 for examples	
iv)	Specify techniques for verifying the position of locked components	iv) Care is taken to employ only the proper test equipment to verify that the system is safe; only persons trained to use test equipment conduct the verification. See <a href="ES&amp;H 1.5.1 Lockout/Tagout Requirements">ES&amp;H 1.5.1 Lockout/Tagout Requirements</a>	
v)	Document when the position of normally locked component is changed	v) Documentation is associated with specific lockout and tagout procedures. See, for example, <a href="OPM 2.6.1">OPM 2.6.1</a> , "Lockout Tagout Procedure for the AGS and Booster Rings, During Accelerator Operations."	
vi)	Perform periodic checks of locked components	vi) The requirements for periodic checks are given in OPM 1.5, "Electrical Safety Implementation Plan," and OPM 13.10.1, "Independent Assessment." In addition Tickler Card #303 used by the ESHQ Division ensures that annual checks of LOTO are performed as per 29CFR1910.147(c)(6)(i) and (ii).	
/	ive Materials and Hardware cludes locks, tags, and chains	Protective Materials and Hardware     a) LOTO materials include standardized locks and tags. See ES&H 1.5.1     Lockout/Tagout Requirements and OPM 2.36, "Lock and Tag Program for Control of Hazardous Energy."	3) Protective Materials and Hardware None
	ckout and Tagout devices should be gularly identified, and meet the following:	b) Locks and tags are singularly identified, and at C-AD they meet the following requirements:	
i)	Able to withstanding the environment in which they are installed	i) Able to withstanding the environment in which they are installed	
ii)	Standardized in size, shape, or color	ii) Standardized in size, shape, or color	
	Substantial enough to prevent removal (50# pull minimum)	iii) Substantial enough to prevent removal (50# pull minimum)	
iv)	Carry the name of the person applying the device	iv) Carry the name of the person applying the device	
v)	Carry a "Warning" notice	v) Carry a "Warning" notice	

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Lockout/Tagout Program     a) Establish procedures for the program	4) Lockout/Tagout Program  a) ESH 1.5.0 Electrical Safety and ES&H 1.5.1 Lockout/Tagout  Requirements establishes the BNL Lockout/Tagout program requirements  for all Departments and Divisions. OPM 1.5, "Electrical Safety  Implementation Plan," and OPM 2.36, "Lock and Tag Program for Control  of Hazardous Energy", which meet Laboratory requirements, is used by C-  AD for Department specific Lockout/Tagout instructions	4) Lockout/Tagout Program None
<ul> <li>5) Procedures for Lockout/Tagout         <ul> <li>a) Procedures should include, but are not limited to following:</li> <li>i) Statement of intended use</li> <li>ii) Specific steps for placing, removing and transferring of tags and locks</li> <li>iii) Testing requirements to verify the</li> </ul> </li> </ul>	5) Procedures for Lockout/Tagout a) C-AD LOTO-specific procedures, for example OPM 2.6, "Lockout/Tagout Procedure for Personnel Entry into the AGS or Booster Ring," or OPM 2.6.1, "Procedure for Lockout/Tagout of AGS and Booster Rings During Accelerator Operations," include: i) Statement of intended use ii) Specific steps for placing, removing and transferring of tags and locks iii) Testing requirements to verify the isolation of the energy source	5) Procedures for Lockout/Tagout None
isolation of the energy source  b) Specific procedures are not required when all the following requirements are: i) Machine has no stored energy after shutdown  ii) Machine has a single, easily identifiable energy source  iii) Isolation of the source will completely deenergize the machine	b) Personnel applying LOTO not covered by a specific C-AD procedure follow the BNL procedure in ES&H 1.5.1 Lockout/Tagout Requirements and OPM 2.36, "Lock and Tag Program for Control of Hazardous Energy."  These procedures require following the operational guidelines of 5 b) i through 5 b) viii.	
<ul> <li>iv) Machine is isolated from the energy source and locked out</li> <li>v) A single lockout device only is required</li> <li>vi) Lockout is under the exclusive control of authorized personnel</li> </ul>		

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GUIDELINE	PERFORMANCE	EXCEPTIONS
vii) Servicing does not create a hazard to other personnel  viii) Employer has a good accident record on the use of Lockout/Tagout  c) Documentation of Lockout/Tagout Usage should be documented and periodically reviewed	c) Documentation of lockouts and tagouts is via LOTO logbooks which are periodically reviewed by supervisors. See <a href="OPM 1.7">OPM 1.7</a> , "Supervisory Practice for Working With Hazards," and <a href="OPM 13.10.1">OPM 13.10.1</a> , "Independent Assessment." In addition Tickler Card #303 used by the ESHQ Division ensures that annual checks of LOTO are performed as per 29CFR1910.147(c)(6)(i) and (ii).	
Application of Lockout/Tagout     a) The program should cover the following procedures:         i) Preparation for Shutdown         (1) Inform affected personnel of hazards and of controls to be used	Application of Lockout/Tagout     a) The C-AD has formal programs and procedures to:      i) Prepare for Shutdown         (1) Personnel are informed during scheduled weekly meetings of hazards and controls to be used in a shutdown. See OPM 2.28.a, "C-A Weekly Meetings Diagrams and Table."	6) Application of Lockout/Tagout None
ii) Machine or Equipment Shutdown (1) Use established procedures	<ul> <li>ii) Machine or Equipment Shutdown</li> <li>(1) See for example shutdown procedure OPM 5.29, "AGS, Booster Ring and Beam Transport Shutdown," and OPM 12.17, "Shut Down Before Power Outage"</li> </ul>	
iii) Equipment Isolation (1) Apply the lockout or tagout device	<ul> <li>iii) Equipment Isolation</li> <li>(1) C-AD has specific LOTO procedures to isolate specific devices.</li> <li>See OPM 2.6, "Lockout/Tagout Procedure for Personnel Entry Into the AGS or Booster Ring."</li> </ul>	
iv) Affixing Locks/Tags  (1) Securely affix tags with qualified personnel	<ul> <li>iv) Affix Locks/Tags</li> <li>(1) Only trained and qualified personnel are allowed to affix LOTO tags. See OPM 1.5, "Electrical Safety Implementation Plan," and OPM 2.36, "Lock and Tag Program for Control of Hazardous Energy"</li> </ul>	
v) Stored Energy (1) Render safe any stored energy and	v) Stored Energy (1) Stored energy is rendered safe. For example, large vacuum	

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GUIDELINE		PERFORMANCE	EXCEPTIONS
	prevent any re-accumulation	windows are covered prior to work on or near the window	
· · · · · · · · · · · · · · · · · · ·	Verification of Isolation (1) Before starting work, verify isolation of the device	vi) Verification of Isolation (1) Personnel are trained to verify isolation of devices before work begins. See ES&H 1.5.1 Lockout/Tagout Requirements and OPM 2.36, "Lock and Tag Program for Control of Hazardous Energy".	
	Release from Lockout/Tagout  (1) Before restoring equipment, perform the following:  (a) Equipment/Workspace  (i) Machine or equipment is operationally intact	vii) Release from Lockout/Tagout  (1) Before restoring equipment, personnel are trained in the ES&H  1.5.1 Lockout/Tagout Requirements and OPM 2.36, "Lock and Tag Program for Control of Hazardous Energy" to ensure:  (a) Equipment/Workspace  (i) Machine or equipment is operationally intact	
	<ul><li>(ii) Inspect area and remove non essential items</li><li>(iii) Person removing the tag/lock should assure that the equipment is properly aligned</li></ul>	<ul><li>(ii) The area is inspected and non essential items are removed</li><li>(iii) The equipment is properly aligned</li></ul>	
	<ul> <li>(b) Personnel         <ul> <li>(i) Check that affected personnel are safe and are informed of energization</li> </ul> </li> <li>(c) Lockout/Tagout Device Removal</li> </ul>	(b) Personnel         (i) That affected personnel are safe and are informed of energization.	
	<ul><li>(i) The person who applied the isolation device shall be the one to remove it</li><li>(ii) Document removal of tag</li></ul>	(c) Lockout/Tagout Device Removal     (i) That the person who applied the isolation device is the one to remove it	
	via logbook or other methods	(ii) That removal of tags is documented	

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GUIDELINE	PERFORMANCE	EXCEPTIONS	
(d) Procedures for removal by a person other than who placed the device:  (i) Verify that the person who placed device is not available  (ii) Make reasonable efforts to inform the person who placed the device that it has been removed  (iii) Ensure that the affected personnel are informed  7) Testing or Positioning of Equipment or Components  a) When a temporary removal is required:  i) Clear the equipment of tools and materials  ii) Ensure that personnel leave from the area  iii) Remove the lockout/tagout device  iv) Perform testing to assure lockout  v) De-energize and reapply the lockout/tagout device	(d) Procedures such as OPM 2.14, "Removal of Locks and Tags by Others" ensure:  (i) That the unavailability of the person who placed device is verified  (ii) That reasonable effort is made to inform the person who placed the device that it has been removed  (iii) That the affected personnel are informed  7) Testing or Positioning of Equipment or Components  a) For temporary removal of LOTO, the specific procedure steps would include the following where appropriate:  i) Clear the equipment of tools and materials  ii) Ensure that personnel leave from the area  iii) Remove the lockout/tagout device  iv) Perform testing to assure lockout  v) De-energize and reapply the lockout/tagout device	7) Testing or Positioning of Equipment or Components None	

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PEI	PERFORMANCE		EXCEPTIONS
,		1	8) Periodic Inspections None
		The use of Do Not Operate Tags and Caution Tags is described in <a href="OPM">OPM</a> <a href="2.13">2.13</a> "Use of Do Not Operate and Caution Tags for Equipment and Systems:" They are not used for personnel protection.	9) Caution Tags None
n any precautions	b)	Tags show: i) Tag identification system ii) Information on any precautions iii) Signature of person applying the tag	
		OPM 2.13 is the record of use  Personnel are trained to ensure the tag does not interfere with operation of	
:	sonnel protection  : tion system on any precautions person applying the tag se tag does not interfere with	sonnel protection  9) Cau a)  tion system  an any precautions  person applying the tag  se  c)  an any does not interfere with  d)	8) Periodic Inspections a) C-AD performs self-assessments and audits of its LOTO program. See  OPM 1.7, "Supervisory Practice for Working With Hazards".  Additionally, the C-AD QA Office performs routine audits of LOTO programs. See OPM 13.10.1, "Independent Assessment" and Tickler Card #303 used by the ESHQ Division which ensures that annual checks of LOTO are performed as per 29CFR1910.147(c)(6)(i) and (ii).  9) Caution Tags a) The use of Do Not Operate Tags and Caution Tags is described in OPM 2.13 "Use of Do Not Operate and Caution Tags for Equipment and Systems:" They are not used for personnel protection.  b) Tags show: i) Tag identification system  ii) Information on any precautions  person applying the tag  c) OPM 2.13 is the record of use

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GUIDELINE		PERFORMANCE	EXCEPTIONS
10) Tra	ining and Communication	10) Training and Communication	10) Training and
a)	Training should include:	a) BNL Web Courses (Electrical Safety I and LOTO) and C-AD facility	Communication
	) B	specific training include:	None
	i) Recognition of hazards	i) Recognition of hazards	
	ii) Purpose of procedures	ii) Purpose of procedures	
	iii) Recognition of the Tagout/Lockout devices	iii) Recognition of the Tagout/Lockout devices	
b)	Training on limitations of tags:	b) Personnel are trained on the limitations of tags as follows:	
	i) Tags are warning device only, with no physical protection	i) Tags are warning device only, with no physical protection	
	ii) Tags should be removed by the person who applied them	ii) Tags should be removed by the person who applied them	
	iii) Tags must be legible	iii) Tags must be legible	
	iv) Tags must withstand environment	iv) Tags must withstand environment	
	v) Tags must be securely attached	v) Tags must be securely attached	
c)	Training on limitation of locks:	c) Training on the limitations of locks is as follows:	
	i) Locks may hinder facility systems necessary for safety	<ul> <li>Personnel are trained that locks may hinder facility systems necessary for safety</li> </ul>	
d)	Retraining:	d) Retraining requirements are as follows:	
,	i) Provide when there is a change in job,	i) C-AD requires retraining whenever there is a change in job	
	equipment, or hazard	classification. C-AD requires specific LOTO training for specific C-	
		AD equipment. Following initial training, individuals are retrained	
		annually to general LOTO requirements and LOTO specific devices.	
11) I o	ckout or Tagout Implementation	Electrical Safety I retraining is required every two years.  11) Lockout or Tagout Implementation	11) Lockout or Tagout
	Implementation shall be by authorized,	a) Implementation is by authorized, qualified personnel only. Trained and	Implementation
a)	qualified personnel only	qualified personnel are listed in <u>BTMS</u> .	None
12) No	tification of Personnel	12) Notification of Personnel	12) Notification of
/	Notify appropriate supervisors or other	a) LOTO establishes generic notification requirements. C-AD procedures	Personnel
	personnel when lockout/tagout devices are applied or removed	establish specific notification requirements.	None
1	**		

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13) Outside Contractors	13) Outside Contractors	13) Outside Contractors
a) Plant and contractor personnel should inform	a) LOTO establishes the responsibilities of visitors and contract employees not	None
each other of their requirements	under C-AD supervision. Outside Departments working at C-AD are	
	subject to requirements in OPM 1.11 "BNL Departments and Outside	
	Service Provider Requirements for Interaction with C-A." Outside	
	contractors under C-AD supervision and working at C-AD are subject to	
	requirements in C-AD OPM 1.12 "Training and Qualification Plan."	
14) Group Lockouts	14) Group Lockouts	14) Group Lockouts
a) Procedures must be developed for crews	a) ES&H 1.5.1 Lockout/Tagout Requirements and OPM 2.36, "Lock and Tag	None
equivalent to procedures for personnel	Program for Control of Hazardous Energy" establish generic group lockout	
Lockout/Tagout	requirements. C-AD procedure OPM 2.6, "Lockout/Tagout Procedure for	
	Personnel Entry into Booster or AGS Ring" establishes the group lockout	
	requirements for the C-AD rings and OPM 7.1.39, "Cryogenic Group	
	Lockout/Tagout" for Collider cryogenic systems.	
15) Shift or Personnel Changes	15) Shift or Personnel Changes	15) Shift or Personnel
a) Procedures should be developed to assure the	a) ES&H 1.5.1 Lockout/Tagout Requirements and OPM 2.36, "Lock and Tag	Changes
continuity of Lockout/Tagout protection	Program for Control of Hazardous Energy" establish generic shift and	None
between personnel or shifts	personnel change procedures for lockout/tagout. These requirements are	
	included in C-AD procedures.	